

CLAIMS

What is Claimed is:

Sub
All

1. A camera system, comprising:
a lens positionable to a plurality of predetermined offset positions within a lens plane, the lens plane located substantially orthogonal to an optical axis of the lens; and
an image sensor having a relatively planar surface and operable to detect light rays originating from one or more objects within an area having a plurality of views, wherein each view is recorded while the lens is positioned at a corresponding one of the predetermined offset positions.
2. The camera system of claim 1, wherein the image sensor represents a CCD array sensor.
3. The camera system of claim 1, wherein the image sensor represents a CCD linear sensor.
4. The camera system of claim 1, further comprising a light shield and a housing partially enclosing the image sensor, the light shield attached between the lens and the housing.
5. The camera system of claim 4, wherein the light shield is a bellows.

6. The camera system of claim 1, further including a translation mechanism coupled to the lens and operable to position the lens at the plurality of predetermined offset positions.

7. The camera system of claim 6, wherein the translation mechanism includes one or more computer controlled linear actuators coupled to a translational stage.

8. The camera system of claim 1, wherein the lens plane is positioned substantially parallel to the relatively planar surface of the image sensor.

9. An image acquisition system, comprising:
a camera system operable to record a plurality of camera images by shifting a camera lens in a plane substantially orthogonal to an optical axis of the camera lens, wherein each camera image represents one of a plurality of views of an area, the area includes one or more objects; and
an image processing system coupled to the camera system and operable to combine the plurality of camera images to produce a composite image of the area.

10. The image acquisition system of claim 9, further comprising a display device coupled to the image processing system operable to display the composite image, wherein the composite image has a higher resolution than the resolution of the camera images.

11. The image acquisition system of claim 10, wherein the camera lens is positionable within the plane to a plurality of offset positions, and wherein the image sensor is operable to detect light rays originating from one of the plurality of views when the camera lens is positioned at a corresponding one of the plurality of offset positions.

12. The image acquisition system of claim 11, wherein the camera further includes a light shield and a housing partially enclosing the image sensor, the light shield is attached between the housing and the camera lens.

13. The image acquisition system of claim 12, wherein the camera system includes one or more video cameras.

14. The image acquisition system of claim 12, wherein the camera system includes one or more line-scan cameras.

15. The image acquisition system of claim 9, further including translation mechanism coupled to the camera lens and operable to position the camera system to record the plurality of views of the area.

16. The image acquisition system of claim 15, wherein the camera system successively records the plurality of camera images.

17. The image acquisition system of claim 9, wherein the camera lens is positioned in a plane substantially parallel an image sensor.

18. An image acquisition system, comprising:

a plurality of cameras operable to record an area having multiple views, the area includes one or more objects wherein each camera is operable to record at least one of the views to produce one or more camera images, wherein at least of the cameras has an offset lens to produce an oblique field of view; and

an image processing system coupled to the plurality of cameras and operable to combine the plurality of camera images to produce a composite image.

19. The image acquisition system of claim 18, wherein all camera images are recorded simultaneously.

20. The image acquisition system of claim 18, wherein the image processing system is operable to produce the composite image by mosaicing the camera images.

21. A method of scanning with a camera system, comprising the steps of:

(a) recording a first view of an area having one or more objects while a lens is positioned at a first position within a plane substantially orthogonal to an optical axis of the lens;

(b) recording a second view of the area while the lens is positioned at a second position within the plane; and

(c) combining all recorded views to produce a composite image having a higher resolution than the resolution of one or more of the recorded views.

22. The method of claim 21, further comprising between step (b) and (c), the step of:

(d) recording a next view of the area while the lens is positioned at a next position within the plane.

23. The method of claim 22, further comprising the step of:

(e) repeating step (d) until all views of the area have been recorded.

24. The method of claim 21, wherein step (c) includes the step of mosaicing all recorded views of the area.

25. A method of scanning with a camera, comprising the steps of:

(a) recording a first view of an area having one or more objects while a lens is positioned at an offset position within a plane substantially orthogonal to an optical axis of the lens while the camera is at a first position;

(b) recording a second view of the area while the lens is positioned at the offset position within the plane after the camera is rotated to a second position; and

(c) combining all recorded views to produce a composite image having a higher resolution than the resolution of one or more of the recorded views.

26. The method of claim 25, further comprising between step (b) and (c), the step of:

(d) recording a next view of the area while the lens is positioned at the offset position within the plane while the camera is rotated to a third position.

27. The method of claim 26, further comprising the step of:

(e) repeating step (d) until all views of the area have been recorded.

28. The method of claim 25, wherein step (b) further comprises the step of recording the second view of the area while the lens is positioned at the offset position within the plane while the camera is rotated 180 degrees to the second position.

29. A method of scanning with a camera system having a plurality of cameras, comprising the steps of:

(a) recording a plurality of views of an area having one or more objects with a plurality of cameras, each camera having a lens positioned within a plane

substantially orthogonal to an optical axis of the lens, and wherein one or more cameras has an offset lens; and

(b) combining all recorded views to produce a composite image having a higher resolution than the resolution of one or more of the recorded views.

30. The method of claim 29, wherein step (c) includes the step of mosaicing all recorded views of the area.